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ABSTRACT

Auto-tutorial instruction was compared to traditional lecture instruction in a university entomology course. In seven consecutive terms, undergraduate students enrolled in an introductory entomology course were divided into two groups: Group I received only lecture instruction on insect orders, while Group II was dismissed for three consecutive 50-minute lecture periods to work with auto-tutorial instructional materials on a self-paced, repeatable basis. These included slide/tape programs and written resource materials covering the same information as the Group I lectures. Participants in the auto-tutorial groups were also asked to respond to a questionnaire assessing their opinions on this method of instruction. An objective test administered to both groups indicated that Group II students with an average auto-tutorial exposure of 90.5 minutes performed comparably to Group I students taught 150 minutes by the lecture method. The majority of Group II students expressed favorable attitudes toward the auto-tutorial method; however, a few students felt that such instruction had a dehumanizing effect. (CMV)

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AUTO-TUTORIAL INSTRUCTION IN ENTOMOLOGY

PRINCIPLES OF ENTOMOLOGY (ORDERS)

D.R. Minnick and K.L. Steele

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Introduction

Principles of Entomology is an introductory course that gives an overall perspective and exposes a student to the various areas of the discipline. It is designed as the introductory course for majors in entomology, other agricultural disciplines, and the university community at large. Approximately one half of the students are majors in the College of Agriculture and the remainder are from other colleges in the university. The course is divided into six principal sections: introduction, arthropods, morphology, physiology, insect orders, insect control, and economic pests of various commodities. The introduction of an auto-tutorial module into the course is described in this article. The pertinent literature associated with auto-tutorial instruction in higher education and entomology in particular has been reviewed in a previous article (Minnick and Webb, 1977).

Purpose

The purpose of this study was to determine whether an auto-tutorial method of instruction could replace the traditional lecture method for teaching insect orders. To complete this section successfully, students were required to become proficient in recognizing and associating characteristics of eighteen insect orders. This portion of the course was selected for study because of previous success with auto-tutorial methods in this area (Minnick and Webb, 1977).

Methods

Beginning Fall Quarter, 1975 and continuing for six consecutive terms, students enrolled in Principles of Entomology were divided into two groups. Information on insect orders was presented to Group I by conventional lecture methods. Group II students were dismissed from

three consecutive 50-minute class periods to work with auto-tutorial instructional materials on a self-paced basis. These materials included slide/tape programs and written resource materials. The audiovisual programs were available at the Office of Instructional Resources Learning Center for nine hours daily, Monday through Friday. Ten Singer Caramates, with headphones, and a manual advance were used to present the programs.

Written resource material included clearly stated performance objectives, and a concise outline of the required information. Students were encouraged to study the written material prior to visiting the Learning Center. The slide/tape programs were organized to supplement and reinforce the outline material.

Initially, five slide/tape programs covering the selected insect orders were available in the Learning Center, however, student demand made it necessary to divide the programs into two parts so that ten students could view the materials simultaneously. At the end of the released classroom time (one week), the auto-tutorial group rejoined the lecture session. The slide/tape programs, however, remained available at the Learning Center for an additional week; students of both the lecture and auto-tutorial groups were administered the same objective test on insect orders. This procedure was repeated each term.

The tests consisted of completion, matching, and multiple choice questions. Five instructors taught the course during the data collecting period. The tests were examined by all instructors to assure that students were presented information covered by test items in both the lecture and auto-tutorial group.

Participants in the auto-tutorial groups were asked to respond to a questionnaire soliciting their opinions on this method of instruction.

During one of the six terms, the amount of time each individual spent studying materials at the Learning Center was determined by clocking students in and out of the center.

All students were exposed to insect specimens in the general laboratory which accompanied the course.

Results

Treatment of one section deviated from the planned procedure when students taught by the conventional lecture method participated in evaluating a teaching assistant. Students in this section were given an additional hour of instruction and a subsequent video taping of the teaching assistant. After eliminating this group there was no statistical difference found between the scores of the auto-tutorial or lecture groups at the five percent level.

Data were collected on the amount of time each student in the auto-tutorial group spent viewing the slide/tape programs at the Learning Center (Fig. 1). As indicated, many students viewed the instructional material more than once. Viewing times ranged from 16 to 162 minutes with the average 90.5 minutes. No correlation was found between the length or frequency of viewing time and test performance.

During the final term, the test items were subjected to an item analysis. Reliability of the test was assessed by the Kuder Richardson formula twenty. KR_{20} correlation coefficients of 0.77 for the auto-tutorial group and 0.70 for the control group were determined.

The pertinent attitude questions and the percent of responses from 342 students are included in Table 1. The questionnaire included an opportunity for the students to indicate whether they thought the auto-tutorial approach saved time over the traditional method of learning.

Of the 342 respondents, 73.1% indicated they learned the material 1/4 to 1/3 faster than by conventional means.

Discussion

The lack of a statistical difference between the two methods of instruction indicates that cognitive materials can be effectively disseminated by the auto-tutorial method of instruction. In the one exception where there was a significant difference in scores favoring the lecture method, the testing parameters were heavily biased by extending the time and focus of the lecture group.

The KR_{20} correlation of .70-.77 level indicate that the testing instrument was reasonably reliable.

Results indicate that students with an average auto-tutorial exposure of 90.5 minutes performed comparably to those taught 150 minutes by conventional lecture. The responses of students to the questionnaire indicated that the auto-tutorial approach saved 25-33% of student time over the conventional lecture method.

The auto-tutorial method of instruction places the responsibility for learning entirely on the student. Results of time studies in the learning laboratory indicate that when students are given alternative methods of learning they sometimes do not use all of the materials provided. Many students would flash through pictures without the tape and others relied primarily on the written handout materials for test preparation. Some students spent minimal time in the learning laboratory and performed exceptionally well on the exam, but the reverse was also true.

Over 50% of the students attended two or more sessions at the Learning Center (Fig. 1). Frequently students who spoke English as a

second language were those in attendance two or more times. No formal correlation was attempted between time spent and vocabulary mastery by these students.

The questionnaire generally indicated a favorable response to auto-tutorial instruction. Although this type of instruction has been prevalent for some time at lower educational levels, over 50% of the students indicated they had no prior experience with this learning method.

In addition to the questions listed in Table 1, there were other questions pertaining to quality of the handout and auto-tutorial materials included in the questionnaire. These questions were used continually for feedback to facilitate product quality.

Examples of reoccurring student responses to two questions are listed below and are a revealing feedback from those exposed to auto-tutorial type of instruction.

Q: Do you like auto-tutorial instruction as well as the lecture method of learning?

Positive: "Better, student can repeat to make sure notes are complete."

"More efficient, Takes less time."

"Only for rote memory material -- is excellent as a reinforcer."

Negative: "No!"

"For this type of subject matter -- but you can't replace Dr. Hall."

"You can't ask questions immediately as you can in lecture."

Q: Would you like additional segments of the course to be taught by this method?

Positive: "Anything available, easier to learn and more interesting."

"Especially as a supplement to lecture."

"... in combination with lecture."

Negative: "Some but not all -- it gets dull."

" I like lectures -- more personal."

"Absolutely not."

One student was adamant to the extent that he felt he was cheated out of his tuition, the university was degraded, and he fully intended to complain to the Department Chairman, Student Services, and the Dean.

Conclusions

In summary the auto-tutorial approach seems to be a useful alternative method of facilitating the learning process for some students. This is especially true for cognitive materials, and for those students who are anxious to assume the responsibility for the learning process. It does not, however, by any means seem to be a panacea. Subjectively, something seems lost from the learning process of even cognitive material when one leaves the discussion arena that normally is present with the lecture method, especially in small classes. Some students put it rather succinctly, "It dehumanizes the learning process."

On the other hand, it seems to save time, affords an organizational network that may not be present with some lecturers, allows a student to repeat material, and also provides a visual impact that may not be present in lecture presentations.

Currently, we are revamping our program by using student feedback to improve our slides and tapes. In the future, we intend to experiment with a compromise of auto-tutorial instruction accompanied with a seminar/discussion approach. It is hoped in this manner that we can accommodate a greater number of students, afford them an alternative in the learning process, and maintain humanistic relationships.

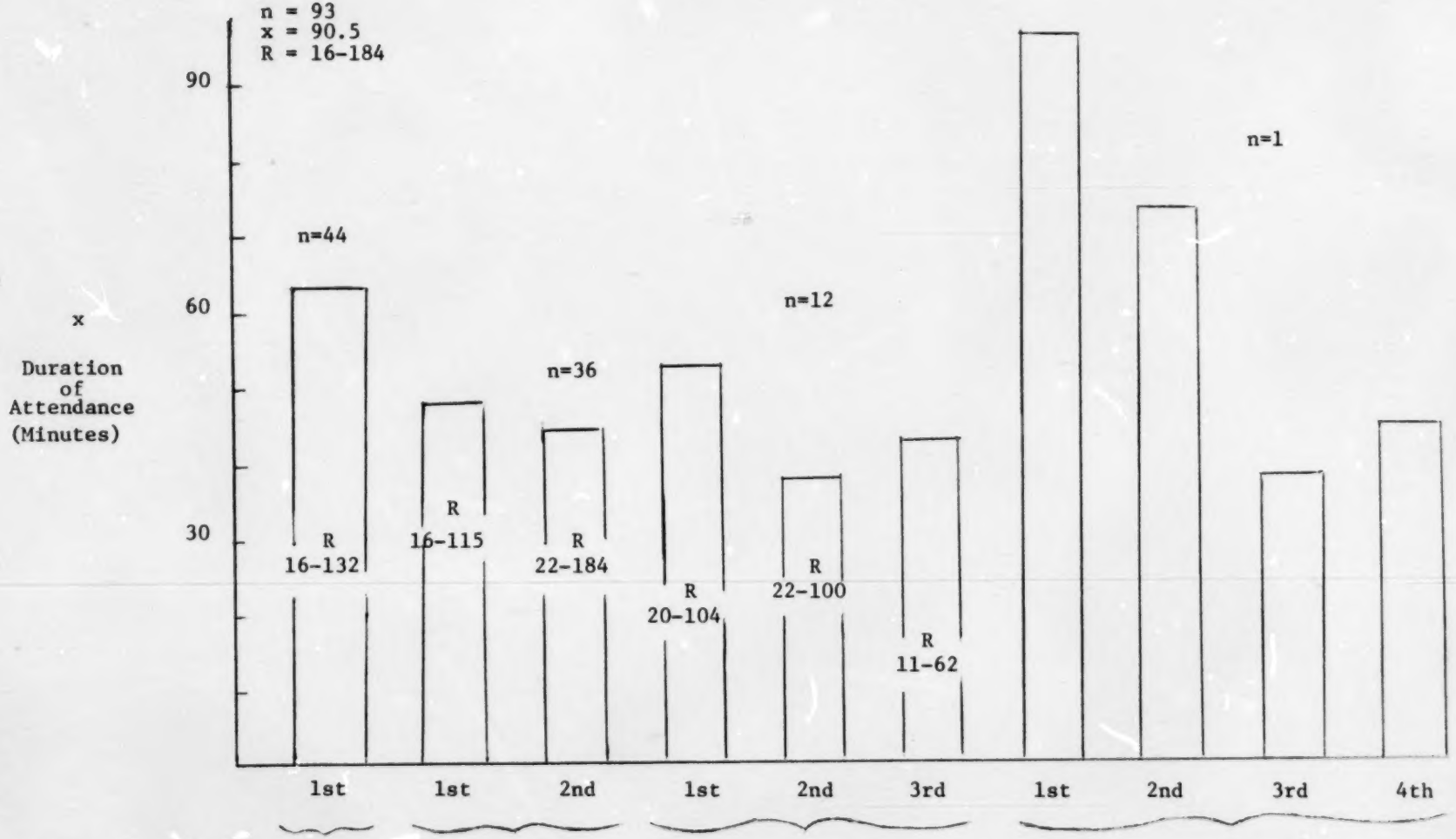
Table 1

Student Response to Selected Questions from the Questionnaire on Auto-tutorial Instruction

Item	Percent	
	Yes	No
1. Have you ever been exposed to this type of instruction?	45.4	54.6
2. Did you like it as well as the lecture method of learning?	60.5	39.5
3. Do you feel you learned the insect orders?	87.5	12.5
4. Would you like other segments of entomology to be taught by this method?	74.0	26.0
5. Did the handout help you to learn the material?	100	0
6. Do you think auto-tutorial and the handout contribute to quality education?	90.0	10.0

Figure 1

Auto-tutorial Attendance and Duration of Attendance



Number of Times in Attendance	1		2		3		4			
Avg. Duration of Attendance	66.6	51.6	47.2	52.7	35.3	39.7	92	74	36	50